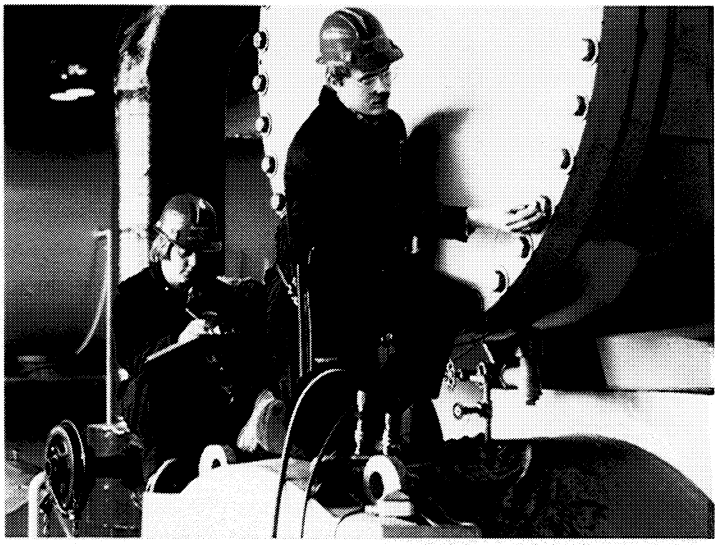
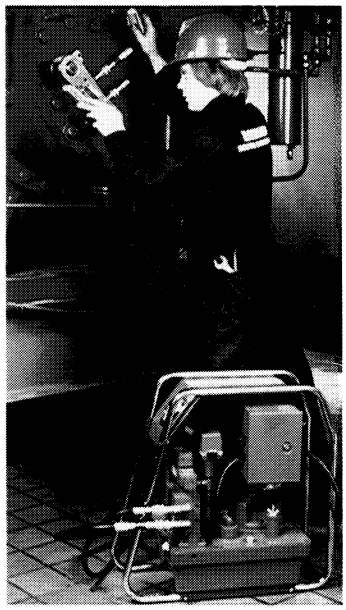
Raymond Engineering Inc., Middletown, Connecticut designs, develops, engineers and manufactures precision electromechanical and electronic systems and devices primarily for the military market. Among the company's principal products are magnetic tape memory systems and peripheral equipment for digital computers; sophisticated safing, arming and fuzing devices for weapon systems; and specialized bolting and torquing equipment for both military and commercial applications.

During the past few years, Raymond's Power-Dyne® Division, also located in Middletown, has expanded the company's scientific bolting capability through development of a line of sophisticated tools and instruments for producing and controlling high torques affecting bolted joints in military, petrochemical, nuclear power, automotive and other applications. Two examples are pictured: at upper right is an ultrasonic bolt gage for monitoring bolt tension and at lower right a worker is using a wrench attachment known as a blind flange adapter, used where there is no adjacent structure to provide a torque reaction point.

Raymond Engineering credits a NASA industry assistance center—New England Research Applications Center (NERAC), Storrs, Connecticut—with a supporting role in development of the bolting tools and in expanding the company's general technology base. Raymond is building a library of knowledge through in-house experimentation and accumulated field experience, complemented by a computerized data bank of information on bolted joints. NERAC has conducted a series of worldwide literature searches of the latest bolting technology, adding to the Raymond library and also contributing to product development.

Technology located through NERAC's search and retrieval service aided company development of the bolting tools by identifying unfilled technical needs and by providing information that helped define better specifications for Raymond Engineering products. The company has also used NERAC's information in designing and presenting a series of Raymond Bolting Seminars, which have been well received in the United States, Canada and the United Kingdom.





"Bolted joints are very complex things," said Raymond Engineering vice president John Bickford. "Their behavior is imperfectly understood. NERAC has been able to educate us in the state-of-the-art of bolted joints . . . The information received from the NASA data base has proven to be very beneficial to the overall program." He added that the new bolting tools have contributed to a sizable sales increase and to the creation of new jobs, within Power-Dyne and in other companies supplying materials to Power-Dyne.

Based at the University of Connecticut, NERAC is one of nine NASA user assistance centers, affiliated with universities across the country, that provide information retrieval services and technical help to industrial and government clients. ▲

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